UG-6028GDEAF01

Evaluation Kit User Guide

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Version: Preliminary

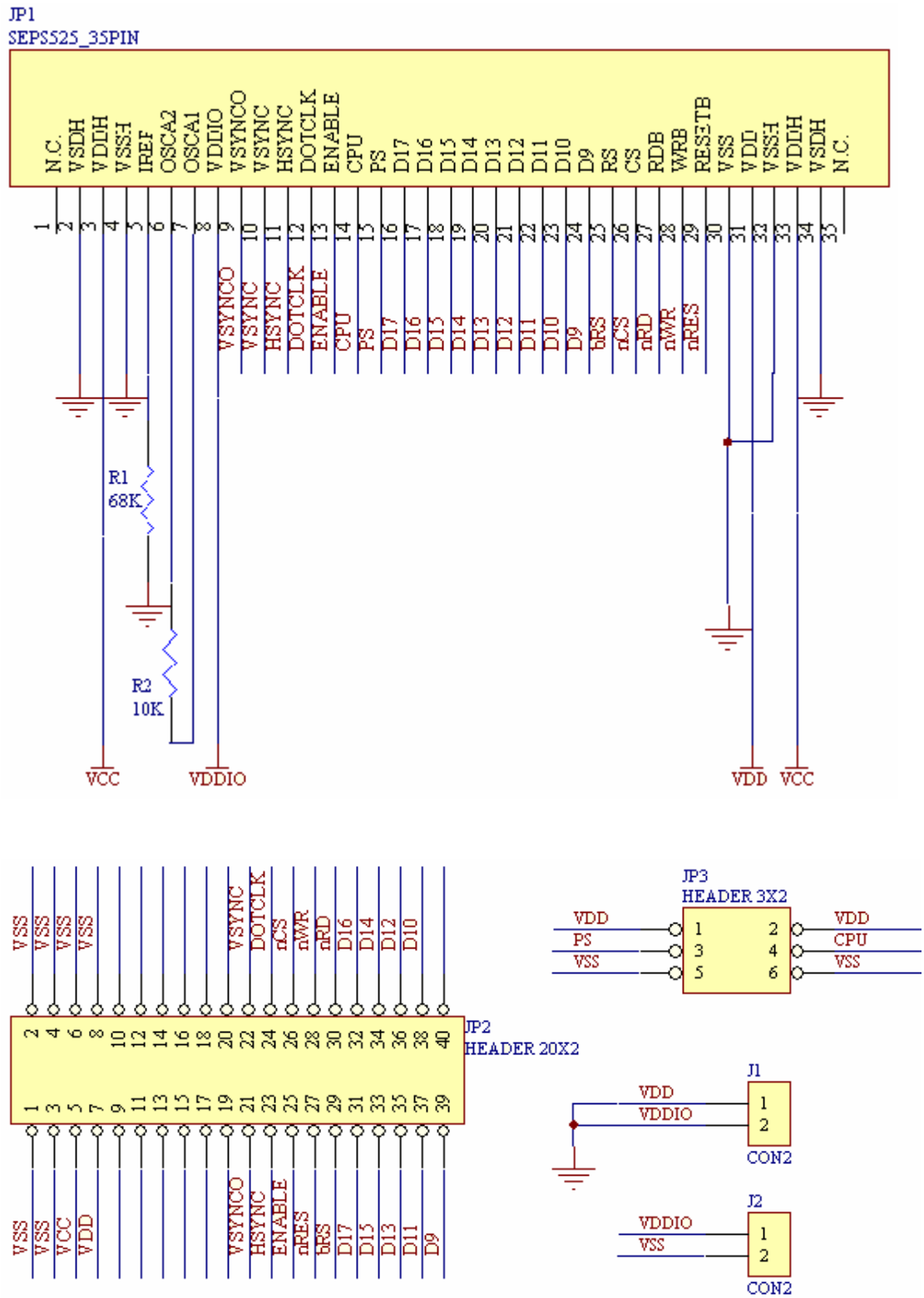
Contents

1. REVISION HISTORY……...3
2. EVK Schematic……..4
3. Symbol define……5
4. TIMMING CHARACTERISTICS……...6
4.1 80-Series MPU parallel Interface ……..6
4.2 6800-Series MPU parallel Interface ……7
4.3 SPI Interface ……..8
5. EVK use introduction……..…...9
6. Power down and Power up Sequence……..11
7. How to use SEPS525F module……...12
7.1 Initial Step Flow……...12
7.2 RD recommend Initial Code for 80 Interface……13
7.2.1 Sub Function for 80 Interface……15

1. REVISION HISTORY

Date	Page	Contents	Version
2006/3/9	*	Preliminary	Preliminary 0.0
2006/05/04	13	Initial setting Modify 04h reg. : 0x01 **à** 0x03	Preliminary 0.1
2006/05/09	5	Add note itmes.	Preliminary0.2
2006/05/10	12	Power on sequence	Preliminary0.3
2005/05/25	11	Power down and Power up Sequence	Preliminary 0.4

2. EVK Schematic



Note: The schematic is already remove R3 and D1. VSDH connect to GND.

3. Symbol define

D17-D9：These pins are 9-bit bi-directional data bus to be connected to the MCU's data bus.
The D10~D17 are for command and data inputs (8bit parallel interface).

CSB：These pins are CSB pins for master and slave driver IC. This pin is the chip select input. The chip is enabled for MCU communication only when CSB is pulled low.

CPU：Selects the CPU type. Low:80-series CPU, High:68-Series CPU.

PS：Selects parallel/Serial interface type. Low: serial,High:parallel.

RDB：For an 80-system bus interface,read strobe signal(active low).For
For an 68-system bus interface,bus enable strobe(active high).
When using SPI,fix it to VDD or VSS level.

WRB：For an 80-system bus interface, write strobe signal (active low).
For an 68-system bus interface, read/write select.
Low: Write, High: Read. When using SPI, fix it to VDD or VSS level.

RESB：Reset SEPS525F(active low).

HV：External Column Driving Power Supply.

LV：Logic power supply.

GND：Power supply ground.

Note1: Please grounding for no use data pin.
Note2: If you are not used RGB Interface ,please grounding VSYNC, HSYNC, Enable,DOTCLK and floating VSYNCO.
Note3: If you are not used VDDIO ,please connect to LV(VDD).

4. TIMMING CHARACTERISTICS

4.1 80-Series MPU parallel Interface

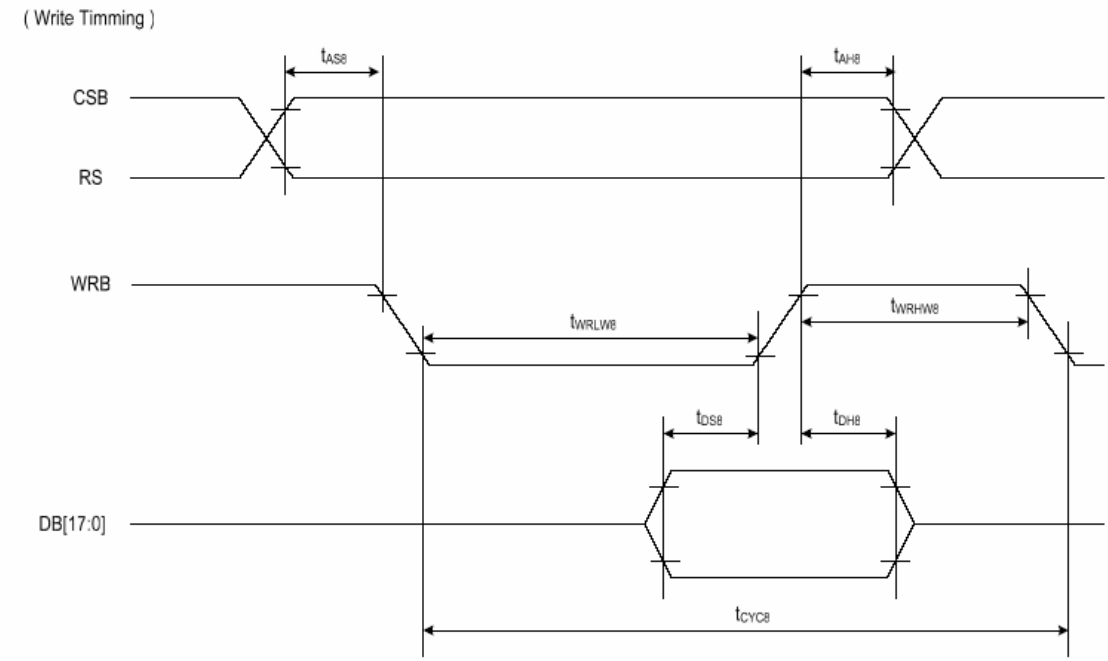


Figure 1 80-Series MPU 8-bit parallel Interface Timing Diagram

(VDD = 2.8V, Ta = 25℃)

ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT	PORT
Address hold timing	t_{AH8}	-	5	-	ns	CSB
Address setup timing	t_{AS8}		5		ns	RS
System cycle timing	t_{CYC8}	-	100	-	ns	WRB
Write "L" pulse width	t_{WRLW8}		45		ns	
Write "H" pulse width	t_{WRHW8}		45		ns	
Data setup timing	t_{DS8}	-	30	-	ns	DB[17:0]
Data hold timing	t_{DH8}		10		ns	

notice) All the timing reference is 10% and 90% of VDD.

Table 1 80-Series MPU 8-bit parallel Interface Timing Characteristics

4.2 6800-Series MPU parallel Interface

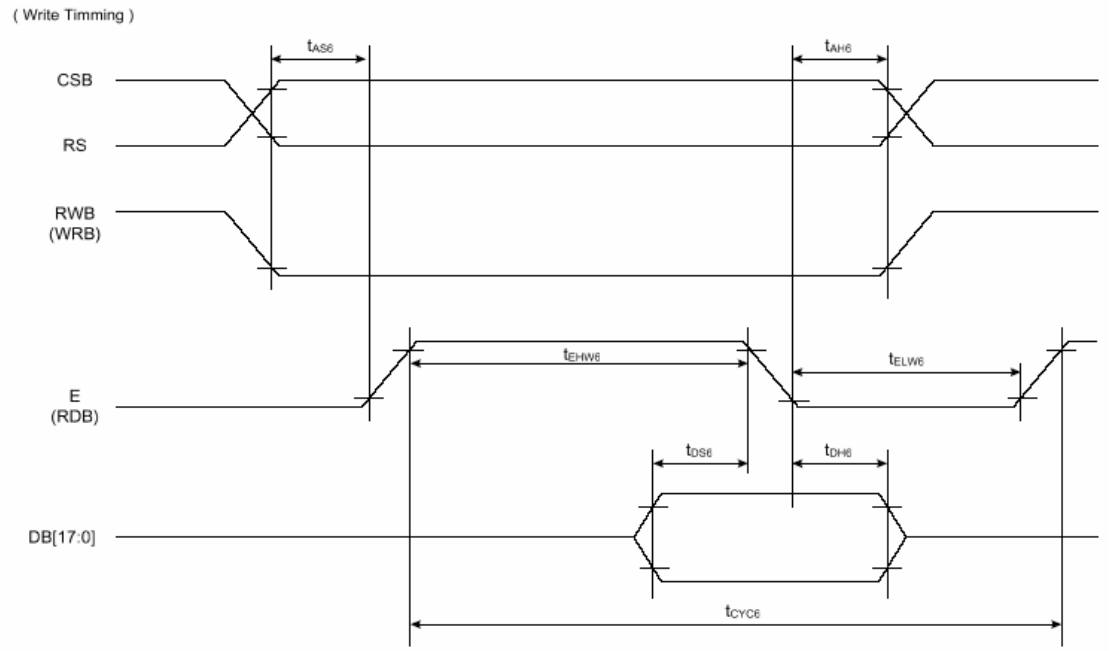


Figure 2 68-Series MPU 8-bit parallel Interface Timing Diagram

(VDD = 2.8V, Ta = 25℃)

ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT	PORT
Address hold timing	t_{AH6}	-	5	-	ns	CSB
Address setup timing	t_{AS6}		5		ns	RS
System cycle timing	t_{CYC6}	-	100	-	ns	E
Write "L" pulse width	t_{ELW6}		45		ns	
Write "H" pulse width	t_{EHW6}		45		ns	
Data setup timing	t_{DS6}	-	40	-	ns	DB[17:0]
Data hold timing	t_{DH6}		10		ns	

notice) All the timing reference is 10% and 90% of VDD.

Table 2 68-Series MPU 8-bit parallel Interface Timing Characteristics

4.3 SPI Interface

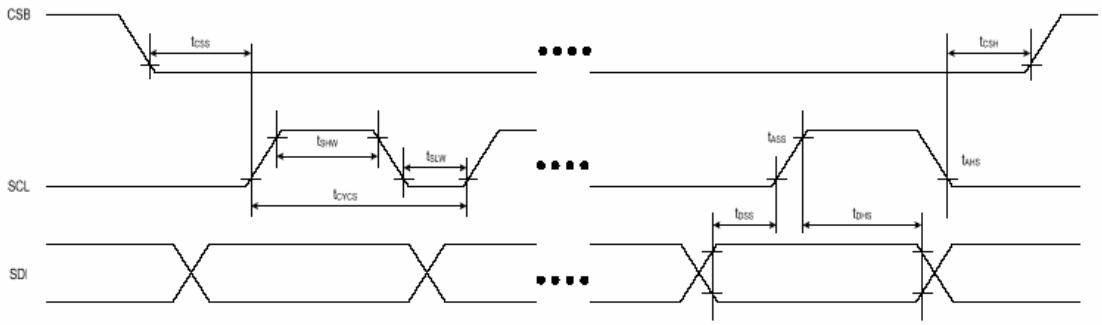


Figure 3 Serial peripheral interface Timing Diagram

(VDD = 2.8V, Ta = 25℃)

ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT	PORT
Serial clock cycle	tCYCS	-	60	-	ns	SCL
SCL "H" pulse width	tSHW		25		ns	
SCL "L" pulse width	tSLW		25		ns	
Data setup timing	tDSS	-	25	-	ns	SDI
Data hold timing	tDHS		25		ns	
CSB-SCL timing	tCSS	-	25	-	ns	CSB
CSB-hold timing	tCSH		25		ns	

notice) All the timing reference is 10% and 90% of VDD.

Table 3 Serial peripheral interface Timing Characteristics

5. EVK use introduction

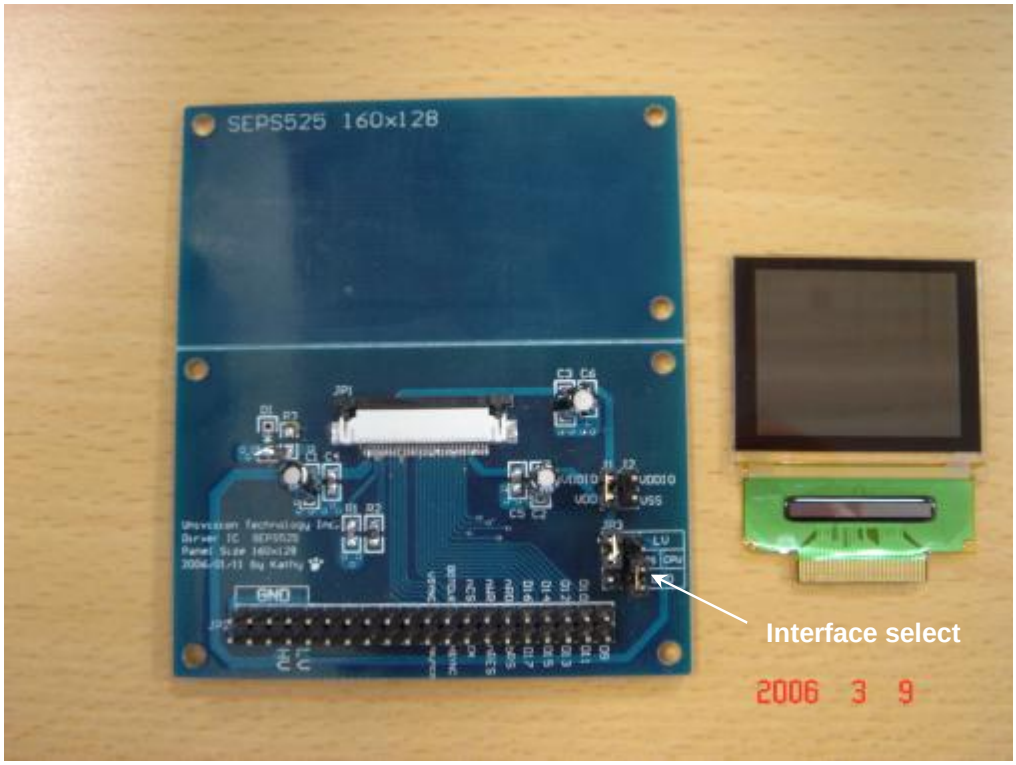


Figure 4 EVK PCB and OLED Module

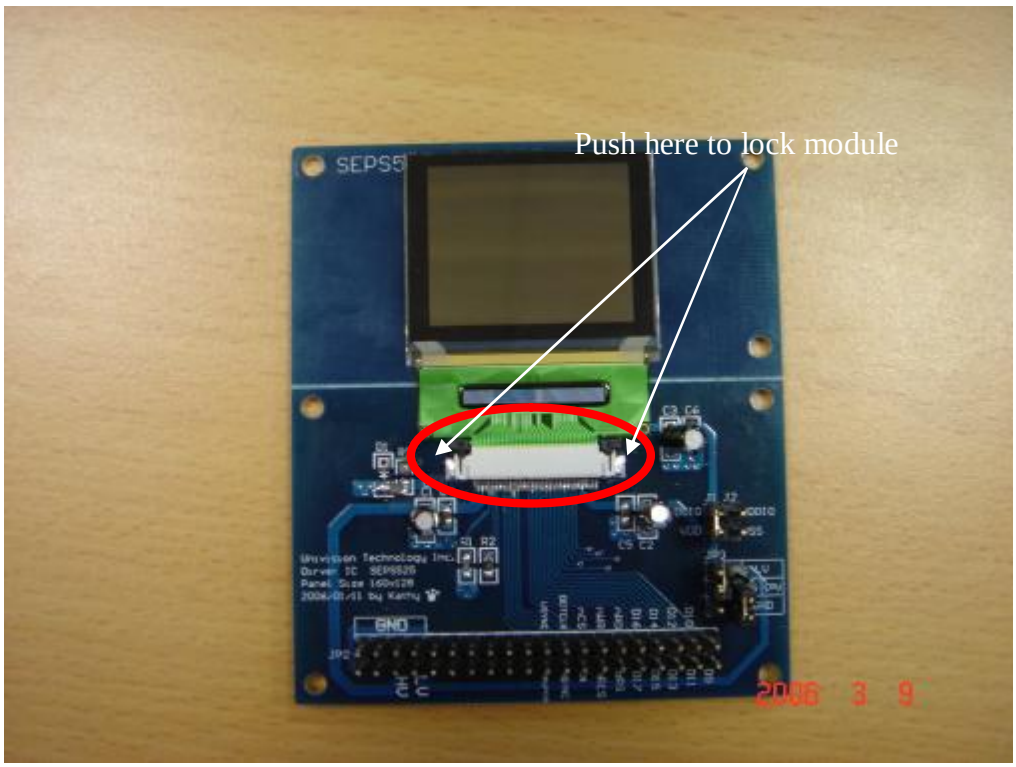


Figure5 The combination of the module and EVK

The SEPS525F is COF type package, that the connect pads are on the top of the module connector. When finished assembled the module and EVK, then push the locking pad to lock the module. See the Figure 4 and Figure5.

User can use leading wire to connect EVK with customer's system. The example shows as Figure 6

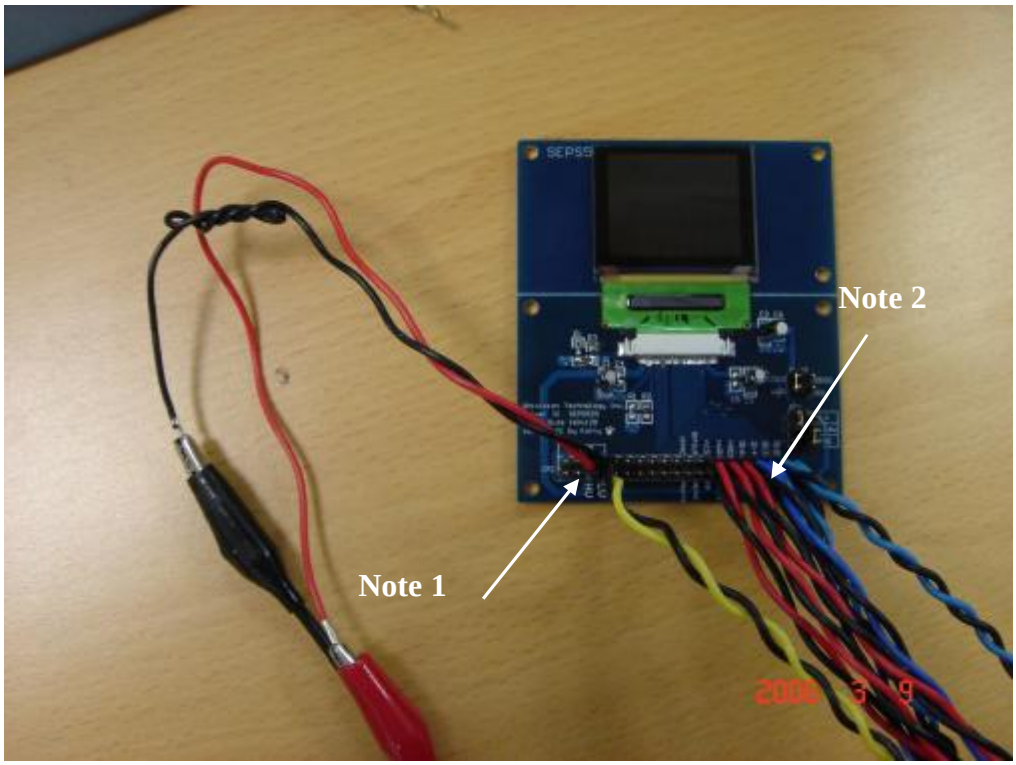


Fig 6 EVK with test platform

Note 1：It is the external most positive voltage supply. In this sample is connected to power supply.

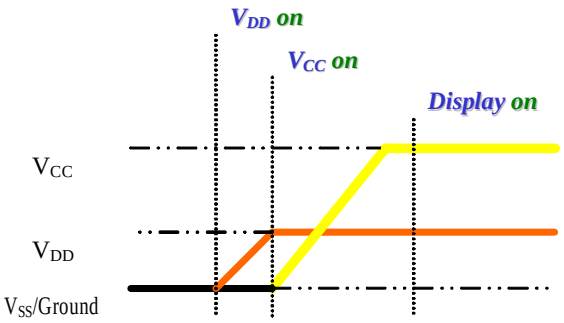
Note 2：The leading wire has 14 pins totally in this case.
(D17-D9, RDB,RS,WRB,RESB,CSB)

6. Power down and Power up Sequence

To protect OLED panel and extend the panel life time, the driver IC power up/down routine should include a delay period between high voltage and low voltage power sources during turn on/off. Such that panel has enough time to charge up or discharge before/after operation.

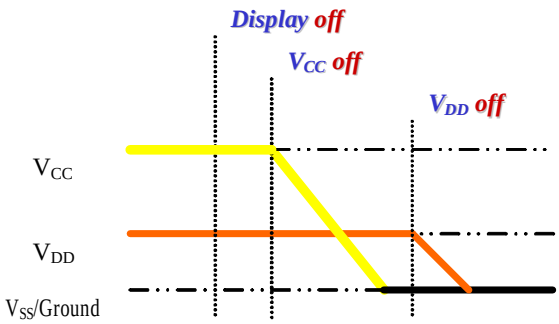
Power up Sequence:

1. Power up V_{DD}
2. Send Display off command
3. Driver IC Initial Setting
4. Clear Screen
5. Power up V_{DDH}
6. Delay 100ms
   (when V_{DD} is stable)
7. Send Display on command



Power down Sequence:

1. Send Display off command
2. Power down V_{DDH}
3. Delay 100ms
   (when V_{DDH} is reach 0 and panel is completely discharges)
4. Power down V_{DD}



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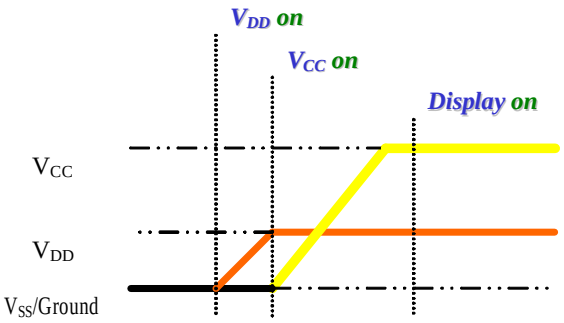
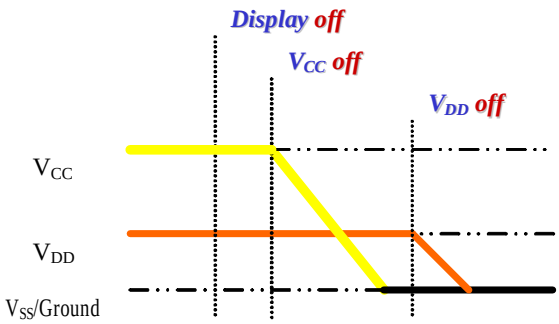
Power up Sequence:

1. Power up V_{DD}
2. Send Display off command
3. Driver IC Initial Setting
4. Clear Screen
5. Power up V_{DDH}
6. Delay 100ms
   (when V_{DD} is stable)
7. Send Display on command



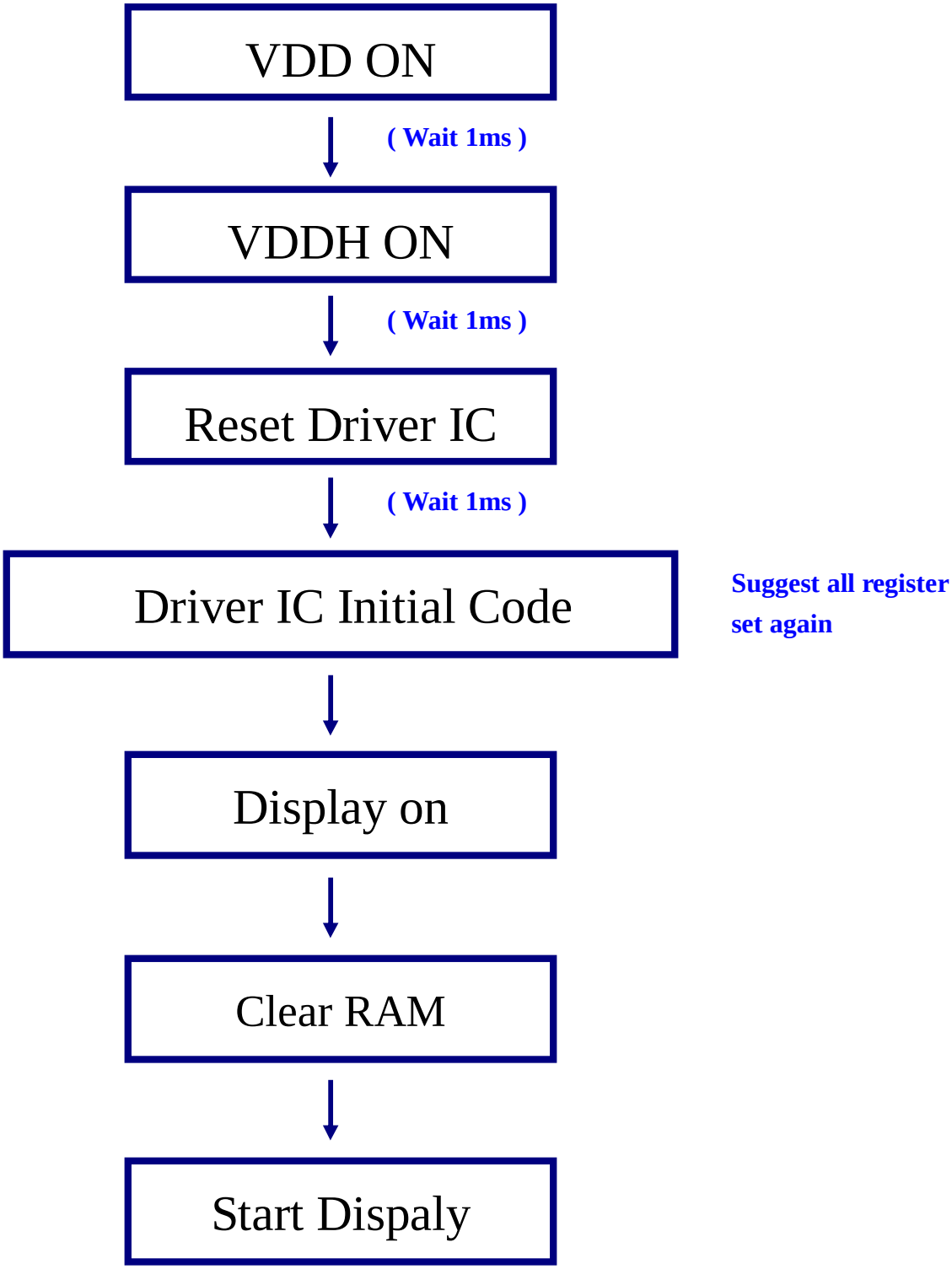
Power down Sequence:

1. Send Display off command
2. Power down V_{DDH}
3. Delay 100ms
   (when V_{DDH} is reach 0 and panel is completely discharges)
4. Power down V_{DD}



7. How to use SEPS525F module

7.1 Initial Step Flow



7.2 RD recommend Initial Code for 80 Interface

```
//Reg:04h  Action:Normal current and PS ON ; Internal osc power off
        Write_Command(rREDUCE_CURRENT,0x03);
        T0_05sec();
//Reg:04h  Action:Normal current and PS OFF
        Write_Command(rREDUCE_CURRENT,0x00);
        T0_05sec();
//Reg:3Bh Action:Screen Saver OFF
        Write_Command(rSCREEN_SAVER_CONTEROL,0x00);
//Reg:02h  Action:Export 0 /OSC with external resister/Internal OSC ON
      Write_Command(rOSC_CTL,0x41);
//Reg:03h  Action:FR=90Hz DIV=1
      Write_Command(rCLOCK_DIV,0x30);
//Reg:80h  Action:PDAC OFF,DDAC OFF/Reference Volt.control with external resister
        Write_Command(rIREF,0x00);
//Reg:08h  Action:set color R precharge time
      Write_Command(rPRECHARGE_TIME_R,0x01);
//Reg:09h  Action:set color G precharge time
      Write_Command(rPRECHARGE_TIME_G,0x01);
//Reg:0Ah Action:set color B precharge tiem
      Write_Command(rPRECHARGE_TIME_B,0x01);
//Reg:0Bh Action:set color R precharge current
      Write_Command(rPRECHARGE_Current_R,0x0a);
//Reg:0Ch Action:set color G precharge current
      Write_Command(rPRECHARGE_Current_G,0x0a);
//Reg:0Dh Action:set color B precharge current
      Write_Command(rPRECHARGE_Current_B,0x0a);
//Reg:10h  Action:set color R dot driving current
      Write_Command(rDRIVING_CURRENT_R,0x52);
//Reg:11h  Action:set color G dot driving current
      Write_Command(rDRIVING_CURRENT_G,0x38);
//Reg:12h  Action:set color B dot driving current
      Write_Command(rDRIVING_CURRENT_B,0x3a);
//Reg:13h  Action:Col D0 to D159/col normal display
      Write_Command(rDISPLAY_MODE_SET,0x00);
//Reg:14h  Action:MPU mode
      Write_Command(rRGB_IF,0x31);
//Reg:16h  Action:8btis dual transfer,65K support
      Write_Command(rMEMORY_WRITE_MODE,0x66);
//Reg:17h  Action:Memory addr.X start
      Write_Command(rMX1_ADDR,0x00);
//Reg:18h  Action:Memory addr.X end
      Write_Command(rMX2_ADDR,0x9f);
//Reg:18h  Action:Memory addr.Y start
      Write_Command(rMY1_ADDR,0x00);
//Reg:1Ah Action:Memory addr.Y end
      Write_Command(rMY2_ADDR,0x7f);
//Reg:20h  Action:Memory X start addr.
      Write_Command(rMEMORY_ACCESS_POINTER_X,0x00);
//Reg:21h Action:Memory Y start addr.
      Write_Command(rMEMORY_ACCESS_POINTER_Y,0x00);
//Reg:28h  Action:Display duty ratio
      Write_Command(rDUTY,0x7f);
//Reg:29h  Action:Display start line
      Write_Command(rDSL,0x00);
//Reg:2Eh Action:Display First screen X start point
      Write_Command(rD1_DDRAM_FAC,0x00);
```

```
//Reg:2Fh Action:Display First screen Y start point
      Write_Command(rD1_DDRAM_FAR,0x00);
//Reg:31h Action:Display Second screen X start point
      Write_Command(rD2_DDRAM_SAR,0x00);
//Reg:32h Action:Display Second screen Y start point
       Write_Command(rD2_DDRAM_SAR,0x00);
//Reg:33h Action:Display size X start
      Write_Command(rSCR1_FX1,0x00);
//Reg:34h Action:Display size X end
       Write_Command(rSCR1_FX2,0x9f);
//Reg:35h Action:Display size Y start
       Write_Command(rSCR1_FY1,0x00);
//Reg:36h Action:Display size Y end
      Write_Command(rSCR1_FY2,0x7f);
//Reg:06h Action:Scan signal is high level at precharge period/Dispaly ON
       Write_Command(rDISP_ON_OFF,0x01);
```

7.2.1 Sub Function for 80 Interface

```
void Write_Register(unsigned char data)
{
       IOCLR = 0x0000000ff;//reset     D0~D7
       IOCLR=bRS;
       IOCLR=nCS;
       IOCLR=nWR;
       IOSET=data;
       IOSET=nWR;
       IOSET=nCS;
       IOSET=bRS;
}
void Write_Parameter(unsigned char data)
{
       IOCLR = 0x0000000ff;//reset     D0~D7
       IOSET=bRS;
       IOCLR=nCS;
       IOCLR=nWR;
       IOSET=data;
       IOSET=nWR;
       IOSET=nCS;
}

void Write_Command(unsigned char Reg, unsigned char data)
{
       Write_Register(Reg);
       Write_Parameter(data);
}
```

RD recommend Initial Code and Sub Function

Note：1.For 80 series CPU interface.

2.For 8bits DDRAM transfer.